An Amateur Radio publication for the Microwave Enthusiast

scatterpoint

Published by the UK Microwave Group

2008 SEPTEMBER

David Wrigley G6GXK sets up the antenna test range at the highly successful Sheffield Microwave Roundtable held on the 12-13th of July this year...

In this issue ...

Latest News ...

- **G3LTP now SK (see backpage)**
- **Scatterpoint Yahoo Group for easier newsletter download**
- **Martlesham Roundtable online booking website now open**

MANY THANKS TO ALL OUR CONTRIBUTORS THIS MONTH ... WITHOUT YOU THERE WOULD BE NO SCATTERPOINT!

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From the Editor's Desk

Welcome back after the "summer"... and what a miserable summer it's been! The only folk to profit by it appear to have been the rainscatter aficionados, in particular Richard, G3CWI, who seems to have been improving his ØDX on a weekly basis!

This month's Scatterpoint is full to the brim again so many thanks indeed to all our contributors who have made the pages so interesting for readers. We have a couple of articles left over, so please be patient if you have sent one of them in and have not seen it yet. We use all we can get!

My thanks also go to Robin, G8APZ, who had to work under the blazing sun of his French summer location to produce his activity news columns while the rest of us sat indoors watching the rain come down in torrents.

By the time you read this, the Crawley roundtable will have come and gone. I hope those attending had a great time. The next major event is the annual Martlesham round table. This is the premier UK event of the year so read the following page and book soon!

For those of you who have problems receiving the email version of Scatterpoint, I have set up a secure Scatterpoint Yahoo group from which you can readily download it every month. To join this group please visit the following URL and sign up:

http://uk.groups.yahoo.com/group/scatterpoint/

and click on JOIN THIS GROUP which can be seen on the top right hand corner above the UKuG logo. Only paid up UKuG members are be able to use this facility. There are already around 50 members on the list.

The newsletter should be available any time from around the 20-22nd of each month. The previous month's edition will also be there and both booklet and single page format versions are available. Eventually I will be putting a full colour version up as well, time permitting. I hope that in time everyone will receive their Scatterpoint by this means and so remove my need to update my email address books every month and get myself branded as a spammer by Tiscali!!

73 from Peter, G3PHO ~ Editor

News, views and articles for this newsletter are always welcome. Please send them to G3PHO (preferably by email) to the address shown above. **The closing date is the Friday at the end of the first full week of the month** if you want your material to be published in the next issue.

THE GREEK MICROWAVE GROUP

The Greek Microwave Group has been established recently by a group of people who are interested in the area of microwaves. It is a public group and everyone can join it including interested people from every country in the world. In fact they encourage people from all over the world to join them and to share their experiences and research with each other. The experience of radio amateurs throughout the years has shown that this is a powerful way of learning. In the past, many amateurs have concluded results that often help the industry with new ideas to improve their products.

Joining this microwave group is absolutely free for everyone and there are no economic benefits for its members. The portal of the group is at **www.microwave.gr**

We would greatly like your participation. There are no restrictions or obligations by your membership as the group is open to everyone. By registering, you will gain access to all areas of the website including the projects section. Your registration will give us prestige and the will to continue this effort of researching and learning.

We are greatly like your cooperation on the group. Since we are recently established we are looking for a way to advertise the group. Would you accept a proposal to put our link to the links section of your site? We can do so in our website too. Thank you very much ...

Yours sincerely,
Konstantinos Giannopoulos
Director of the GMG

Martlesham Microwave Round Table

8-9 November 2008

Some of you have already spotted that the web site **http://mmrt.homedns.org/** for the Martlesham Round Table is now open for bookings. If you intend to stay over the whole weekend, please book now to be sure of hotel room availability and get a place at the Saturday dinner. **In any case it is essential to register your intention to attend as the security gate staff will not let you through unless you are on their list!**

We have yet to finalise some of the speakers/lecture topics but the current list is below (but please note that it is NOT yet final)

Jim Bacon G3YLA - weather/meteorology topic
Kent Britain WA5VJB - Waveguide talk
Dave Robinson WW2R/G4FRE - SDR talk
Chris Bartram GW4DGU - talk title TBC
Zdenek Samek OK1DFC - EME 2008 talk
Michael Kohla DL1YMK - EME dish/feed
UKUG AGM
Contest Forum

If you are flying in to Stansted, then you may be interested in the new coach service that runs to Ipswich. The URL with details is on the TRAVEL tab on the MMRT site.

Please note that the Saturday Dinner is at a different hotel from last year.

We look forward to welcoming the 'regulars' once more! If you have never been or haven't attended for a number of years then why not come along this time?

73 from Graham Murchie - G4FSG

SPECTRUM FORUM NEWS

The IARU-R1 papers (both C4-HF and C5-VHF/Microwave) have been added to the RSGB Spectrum Forum website:

http://www.rsgb.org/spectrumforum/IARU_R1_Conference_2008/

We were also expecting an updated distribution during August which should fix a few errors/ omissions, and may see a few being moved to be considered by the C3 Policy committee instead

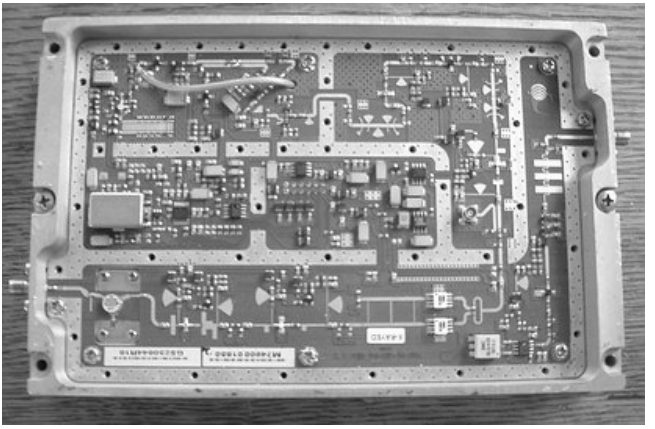
Murray G6JYB, RSGB Microwave Manager

DXR – 700 TRV conversions to 5.7GHz

by Stephen, ZL1TPH

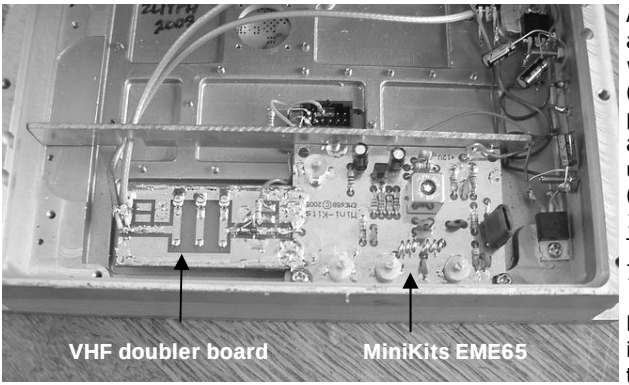
This unit (**see photo right**), made by DMC (7.1GHz), can be converted to the 5.76GHz amateur band using a 144MHz IF. The intention of this paper is not to be specific but to explain how easy they are to convert. This may assist entry level/ beginners workshops.

These units have been available for a number of years from the Wellington VHF group here in New Zealand.



Visit **http://www.vhf.org.nz/pubs/TradingTable/mwave6.pdf** for more details.

Rather than use the original PLL I have used crystal oscillator injection at 1123.2 MHz and feed this into the onboard multiplier chain on both the TX and RX boards.

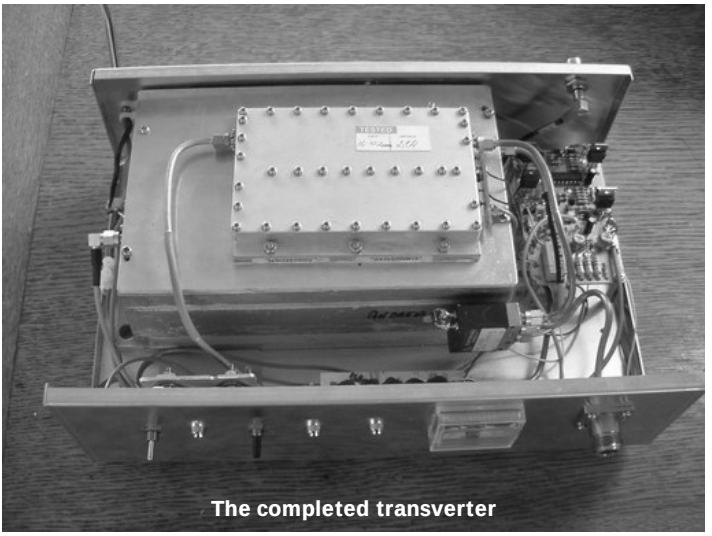


A 93.6MHz crystal is used with an EME 65 kit from **www.minikits.com.au/** (Mini-kits Australia). The output from 561.6MHz is fed into a Waikato VHF doubler board using an ERA 3 as a multiplier (**see photo left**). Output at 1123.2MHz is then fed to both TX and RX boards of the DXR – 700.

Voltage connections to the DXR – 700 are via pins internal in the casing where the oscillator chain is housed. I use three 9 volt regulators and these are each used to feed the TX, RX and oscillator boards. Just three pins are used for DC connections on each board.

Because the onboard filters in the multiplier chain are no doubt tuned around the original 7GHz frequency, they do seem to be somewhat misforgiving at 5616 MHz. Only one stub requires a tab and that is the filter before the final GaAsFET in the multiplier chain.

Because the 1123.2MHz oscillator injection will also multiply by 6 to 6739.2 MHz (which we do not want) a 5.7GHz narrow band pass filter is required on TX. Here in New Zealand, we use the 7.1GHz filters returned to 5.7GHz by lengthening the posts with a blob of solder.



The completed transverter

Effectively, at this point, we have an easy 10 ~ 20 milliwatt TX output on 5.7GHz and RX NF of about 6dB. For connections to a 144 MHz IF (ICOM 202 or FT 817) I use a sequencer from Min – kits which gives a host of functions such as RX /TX drive levels and DC switching, etc. As can be seen in the photo left, I use one of the 7.1GHz power amplifiers and this gives a TX output of 5 watts.

Improvements would be a good RX preamp on receive and a post 5.7GHz filter but, even without these, we here in New Zealand have managed 350km contacts using only 60cm dishes. The conversion of one of these units is relatively easy for the new comer / entry level to microwave construction, with assistance from others in the UKuG microwave group.

73 from Stephen ZL1TPH

Editor's comments:
Many thanks indeed Stephen for the most interesting article. Amateur microwaves seem to have risen to new heights in NZ since I was last living there in the 70s! There was none of this excellent surplus equipment available then.

SCATTERPOINT YAHOO GROUP... the easy way to receive your newsletter

I've now set up a UKuG members only Scatterpoint Yahoo Group for the sole purpose have having each month's Scatterpoint available online for you to download if you don't receive it via the usual email from me.

The Group is definitely not intended to be a reflector for discussions and emails, etc ! If you wish to contact the Scatterpoint editorial team then please use the email addresses shown on page 2 of every issue.

So, from now on, if by the 22nd of each month you haven't received Scatterpoint, if you have registered on this new group, check the Scatterpoint Yahoo Group to see if it has been uploaded.

For those of you with email addresss that regularly "bounce", when I try to use them then the Scatterpoint Group will be your **only** access route to Scatterpoint until further notice.

I have already uploaded the July-August 2008 edition to the Yahoo Group and the June edition is also still there. The September 2008 edition will be there by the time you receive this emailed version. To be able to download the file you must register as a member of the Scatterpoint Group. To do this go to:

http://uk.groups.yahoo.com/group/scatterpoint/

and click on JOIN THIS GROUP which can be seen on the top right hand corner above the UKuG logo.

I appreciate that not everyone wishes to join Yahoo Groups but, if not and you are a Tiscali subscriber, could you please set up a googlemail or hotmail email address solely for Scatterpoint delivery?

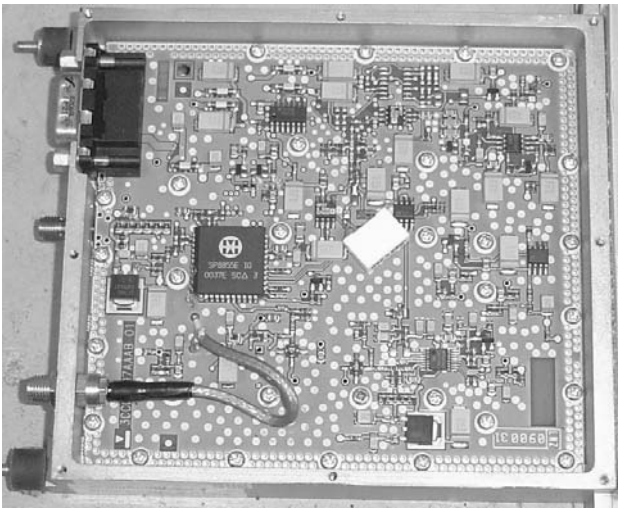
I will monitor the membership so that only full paid up UKuG members are on the list.

* One day all electronic Scatterpoints might well be available by this means only *

73 from Peter, G3PHO, Scatterpoint Editor

Modification of Alcatel 9400UX Synthesisers

by Roger Ray G8CUB



Many Alcatel Outdoor Units have been purchased, for conversion to 24GHz. For some reason the synthesiser local oscillator is not often used – why? The following article describes simple modification to this parallel loaded synthesiser, which uses a 10MHz external reference, to give an accurate clean LO. One possible use, allows one unit to provide an LO for 10GHz and 5.7GHz (even 24GHz as well), just by switching a few pins.

Two different synthesiser chips, are used in different models, Zarlink, or Qualcomm, modification is very similar for each model. In each case the parallel loaded 'slow' loop is used, the 'fast' fractional-n loop is disconnected.

Excellent information on other Alcatel modifications from F4DAY, F6DR0, F1VL and others, together with IC data sheets can be found on the web.

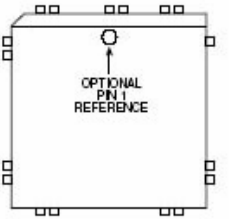
Modification of Zarlink SP8855E Synthesiser

Example 9.936GHz LO (4968MHz) for 10GHz with 432MHz IF. The synthesiser came from a 23GHz ODU. This uses a parallel loaded synthesiser, so that no programming is involved.

Reference: External 10MHz
Frequency: LO = 10368 - 432 = 9936MHz (LO on the low side)
Synth. Output - 4968MHz, VCO - 2484MHz, Div by 2 into synth. chip 1242MHz

Using highest reference from 10MHz input = 2MHz
Divide ratio = 1242 / 2 = 621
Set 621 on 'input bus' 0 is pin 11 …bit 10 is pin 1
Bit 13 12 11 10 9 8 7 6 5 4 3 2 1 0
0 0 0 0 1 0 0 1 1 0 1 1 0 1

Looking at the SP8855E pin out diagram (right), check the IC with an ohm meter and find which bus pins on the IC are grounded. Bit 0 is pin 11 …bit 10 is pin 1. On those that need to be a high (1) cut through the pin with a fine sharp pair of cutters. This is the only difficult bit! It looks like the pin only has a fine track to the ground plane – it is actually grounded underneath as well … hence the need to cut the pin. I wired the pins that needed to be high (1) together, then through a 1k resistor to 5V supply, though leaving them o/c may be OK.

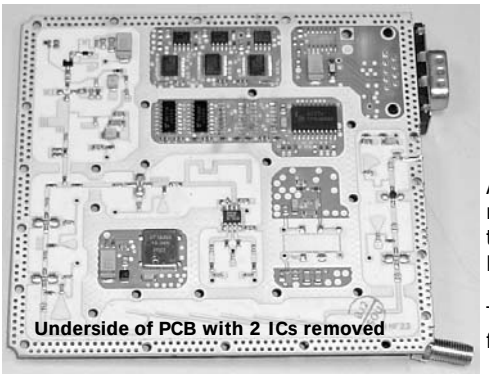


HP44

Pin	Description	Pin	Description
1	Input bus bit 10	23	Control Direction
2	Input bus bit 9	24	F_{pd}
3	Input bus bit 8	25	F_{ref}
4	Input bus bit 7	26	+5V
5	Input bus bit 6	27	Ref. osc capacitor
6	Input bus bit 5	28	Ref in/XTAL
7	Input bus bit 4	29	Reference bit 9
8	Input bus bit 3	30	Reference bit 8
9	Input bus bit 2	31	Reference bit 7
10	Input bus bit 1	32	Reference bit 6
11	Input bus bit 0	33	Reference bit 5
12	0V (prescaler)	34	Reference bit 4
13	RF input	35	Reference bit 3
14	RF input	36	Reference bit 2
15	V_{CC} + 5V (prescaler)	37	Reference bit 1
16	V_{EE} 0V	38	Reference bit 0
17	Lock detect output	39	Phase Detect Enable
18	C-lock detect	40	Phase Detect Gain 1
19	Rset	41	Phase Detect Gain 0
20	Charge pump output	42	Input bus bit 13
21	Charge pump ref.	43	Input bus bit 12
22	F_{ref}/F_{pd} enable	44	Input bus bit 11

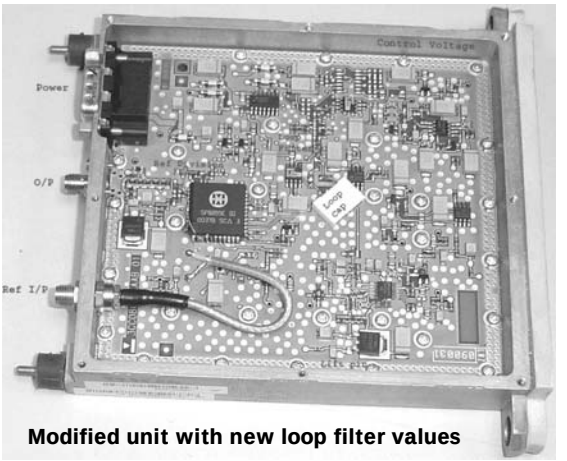
For 10MHz reference:
Divide by 5 (00000000101) ref. frequency = 2MHz
Standard is divide by 1, so just cut the track to bit 2 (pin36) from 0V and connect to supply as bit 0 (pin38)

Underside - unsolder the top mounted TCXO pins and remove and remove 2* IC 8574T as shown in the picture below:


Underside of PCB with 2 ICs removed

Add a coax cable to where the TCXO was removed for the external reference signal. Lift the supply pin to the regulator feed the LMX**** fast loop which is not used.
This should give a working synthesiser. Though to give a reasonable phase noise performance it is necessary to change 3 components in the loop filter.
Looking at the photograph (right) remove 2 back to back 1u0 tantalum capacitors next to the OP25 loop filter amplifier. Bridge the pair with a good 68n capacitor. One side of that new capacitor connects only to a resistor and capacitor. Change the resistor to 5k6, and change the capacitor to 4n7. Further experimentation in loop filter values may be beneficial.

Looking at the spectrum analyser plots for the 10GHz LO (see later pages) there are some spurs approximately 32kHz either side of the carrier. Some work on the additional twin-T



Modified unit with new loop filter values

filter in the loop circuit could probably reduce these. The phase noise is certainly not as low as can be achieved with a crystal oscillator multiplier chain but this synthesiser gives adequate performance, using an external reference and can be completed in about 1 ½ hours.

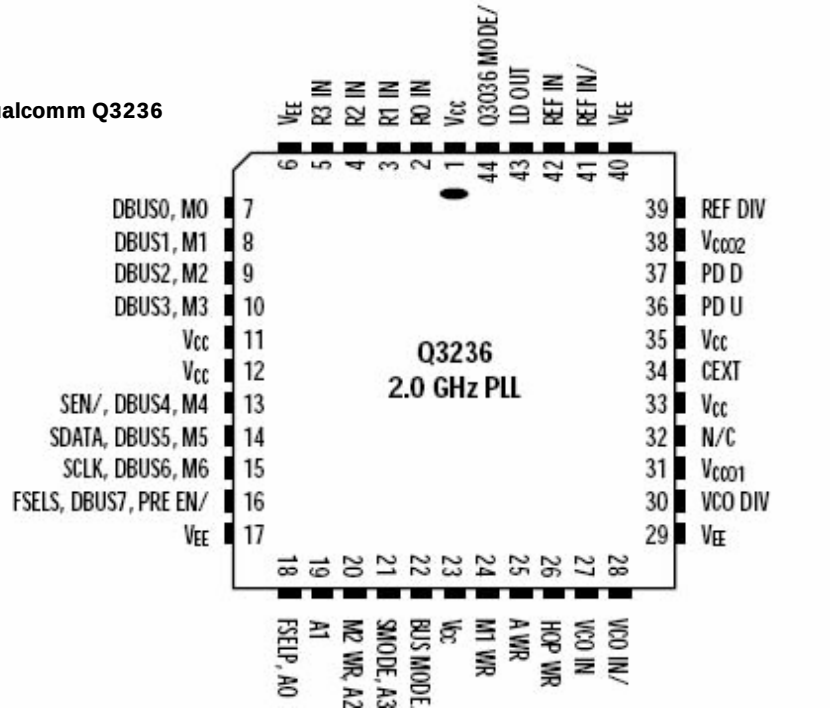
Two or three band synthesiser?

By changing the 8 frequency setting pins it should be possible to provide a synthesiser for 10GHz and 5,7GHz. The same unit could also do 24GHz with 23cm IF, if the VCO supply voltage is increased to 28V (this works OK)
Note I have not tried the 5.7GHz version yet, and the maths below is unchecked!

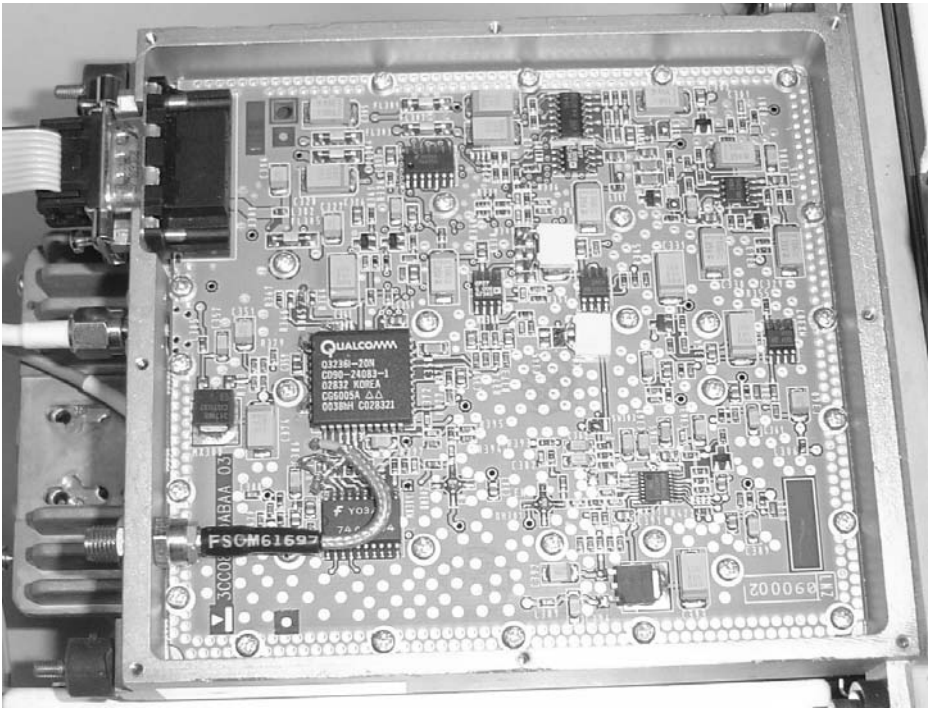
10GHz – as described division 621 01001101101
5.7GHz 432MHz IF division 666 01010011010
5.7GHz 144MHz IF division 702 01010111110
24GHz 1296MHz IF division 721 01011000111

Two 4 pole c/o relays would do 5.7 / 10GHz without getting involved in eproms.

Modification of Qualcomm Q3236 Synthesiser



These units provide easy modification for use on 24.048GHz, 432MHz IF high side injection. A 24.5GHz ODU used high side LO injection, so to maintain the operation of the image-rejection mixers, and use the fitted synthesiser for 24GHz, this modification was performed. No pins need to be cut and there are no loop filter changes for this application!



Reference: External 5 or 10MHz
Frequency: LO = 24048 + 432 = 24,480MHz
Synth output: 6.12GHz, VCO 3.06GHz, Div2 into synth. Chip 1530MHz

For 5MHz Ref: Division = 306

Using 5MHz external reference
R=1, set = 1-1 = 0 (pins 2,3,4,5 low – no change)

For 10MHz reference:
R=2, set=2-1 = 1 (pin2 high, use 100Ω resistor in R364 position) – this gives reference frequency of 5MHz, divides 10MHz by 2

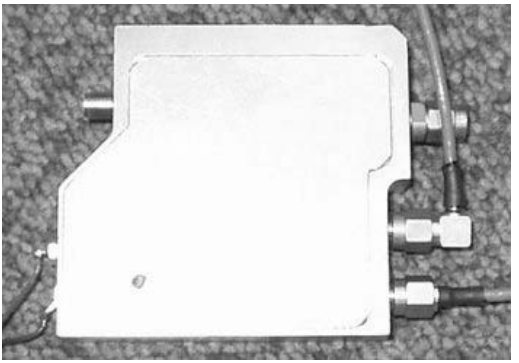
M=30, set 30-1 = 29 (pins 7,9,10,13 high)
A=6 (pins 19,20 high)

High = not grounded – refer to Q3236 data sheet.

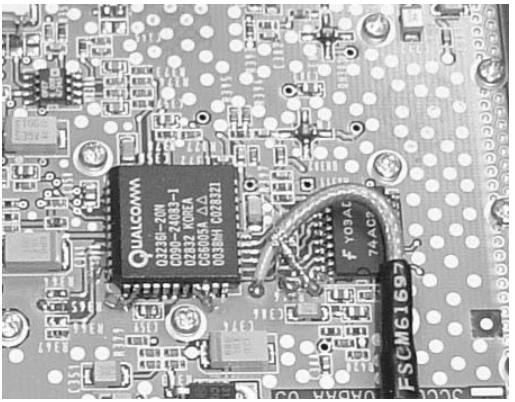
To make this modification:
Top – solder together pins 14 and 15(15 = 0V)
Connect pin 8 to 0V
Remove R411 to R416, connect pins 18, 21 to 0V
Underside - unsolder 16MHz TCXO, remove 2 x IC 8574T as shown.

Add a coax cable to where the TCXO was removed for the external reference. Lift the supply pin to the regulator feed the LMX**** fast loop which is not used.

Note with high side conversion 24048 – 24050MHz, gives an IF 432 – 430MHz, which is not a problem for the FT817 etc. Just remember to switch to LSB and use a look up table!



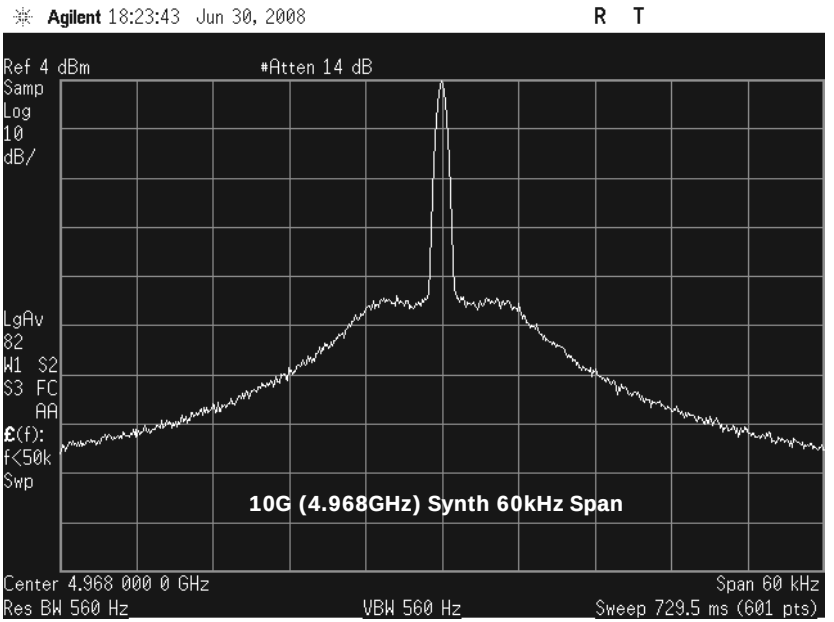
Modification detail of PCB and photo of Tx driver box, just used for its doubler.

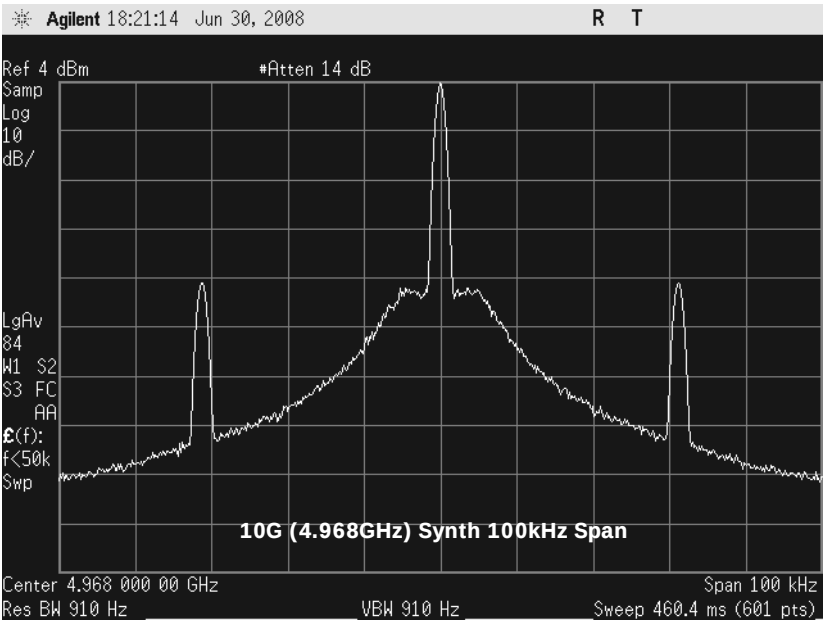


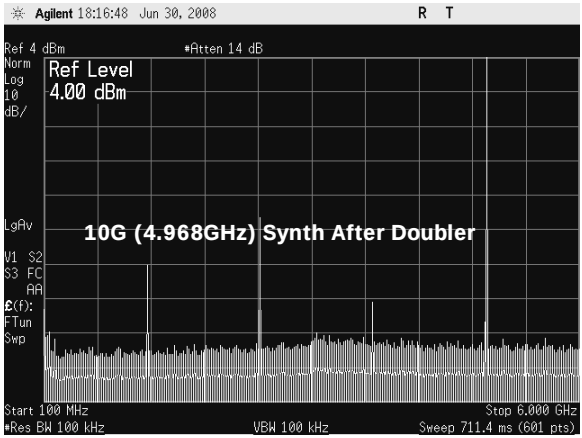
The Qualcomm is much cleaner than the Zarlink, with lower phase noise, though this may well be due to the higher reference frequency used. It is, of course, necessary to use a clean 10MHz reference. An off air standard was not clean enough for 24GHz, while an ovened 10MHz oscillator was fine.

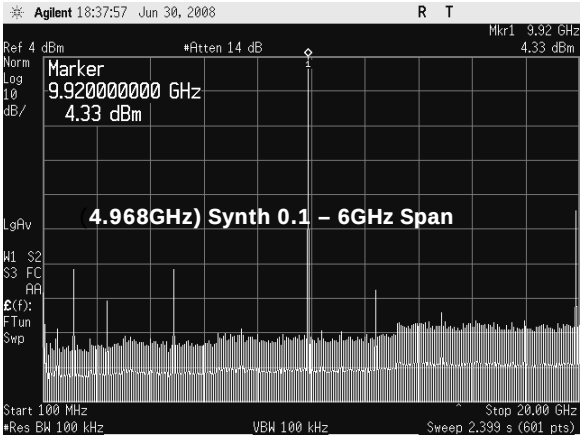
Conclusion

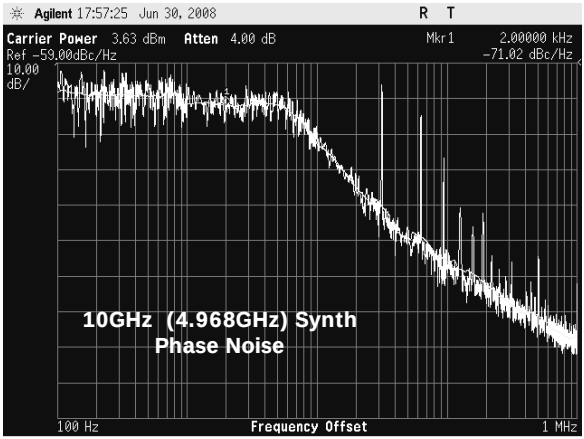
A quick synthesised LO from the Alcatel ODU. In my transverters I have kept the original PSU, feeding a common -60V supply (using 5 x 0.5A 12/12V DC/DC converters).
They can be very low cost, I bought one synthesiser and PSU on ebay for £1.99!
Stability is as good as the reference, and phase noise is adequate for normal terrestrial use.

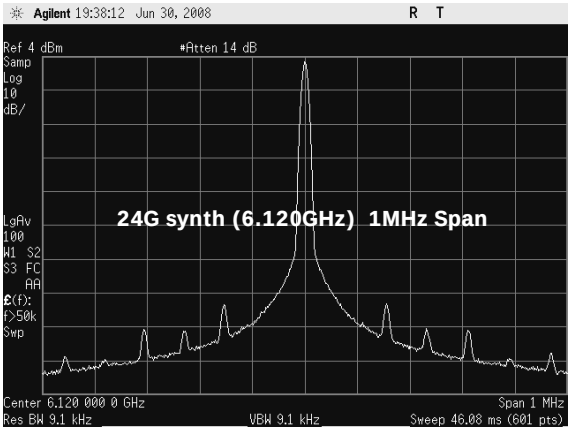

Agilent 18:23:43 Jun 30, 2008
R T
Ref 4 dBm
#Atten 14 dB
Samp
Log
10
dB/
LgAv
82
W1 S2
S3 FC
AA
£(f):
f<50k
Swp
10G (4.968GHz) Synth 60kHz Span
Center 4.968 000 0 GHz
Span 60 kHz
Res BW 560 Hz
VBW 560 Hz
Sweep 729.5 ms (601 pts)

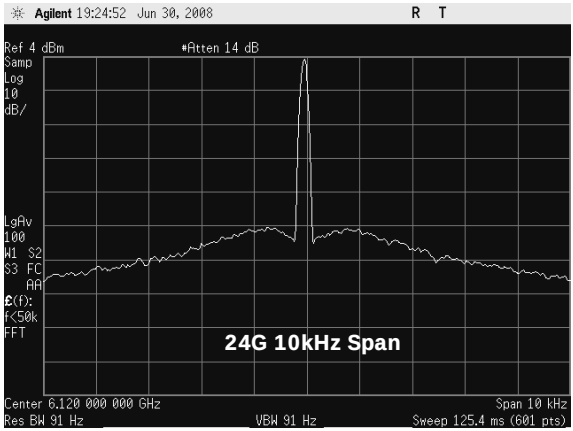

Agilent 18:21:14 Jun 30, 2008
R T
Ref 4 dBm
#Atten 14 dB
Samp
Log
10
dB/
LgAv
84
W1 S2
S3 FC
AA
£(f):
f<50k
Swp
10G (4.968GHz) Synth 100kHz Span
Center 4.968 000 00 GHz
Span 100 kHz
Res BW 910 Hz
VBW 910 Hz
Sweep 460.4 ms (601 pts)

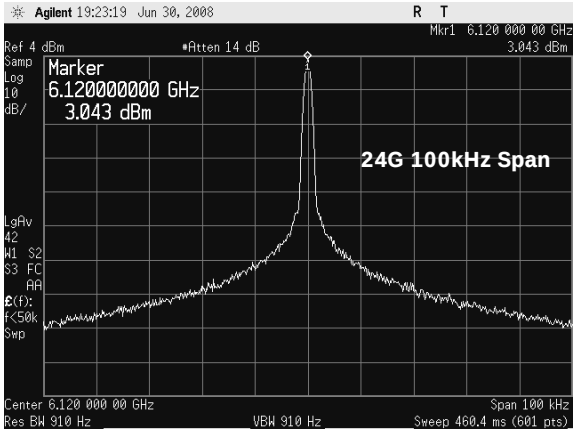

Agilent 18:16:48 Jun 30, 2008
R T
Ref 4 dBm
#Atten 14 dB
Norm
Log
10
dB/
Ref Level
4.00 dBm
LgAv
10G (4.968GHz) Synth After Doubler
W1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 100 MHz
Stop 6.000 GHz
#Res BW 100 kHz
VBW 100 kHz
Sweep 711.4 ms (601 pts)

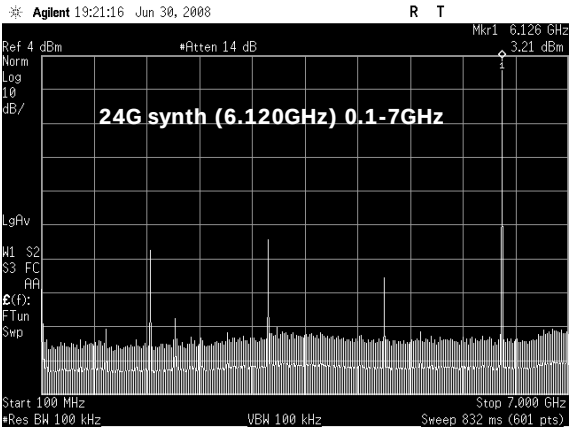

Agilent 18:37:57 Jun 30, 2008
R T
Mkr1 9.92 GHz
Ref 4 dBm
#Atten 14 dB
4.33 dBm
Norm
Log
10
dB/
Marker
9.920000000 GHz
4.33 dBm
LgAv
4.968GHz) Synth 0.1 – 6GHz Span
W1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 100 MHz
Stop 20.00 GHz
#Res BW 100 kHz
VBW 100 kHz
Sweep 2.399 s (601 pts)

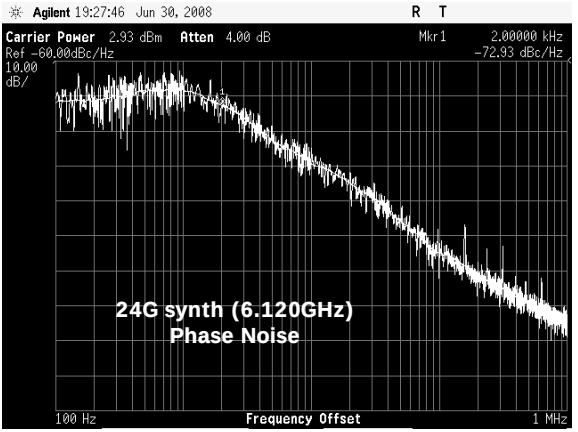

Agilent 17:57:25 Jun 30, 2008
R T
Carrier Power 3.63 dBm
Atten 4.00 dB
Mkr1 2.00000 kHz
Ref -59.00dBc/Hz
-71.02 dBc/Hz
10.00
dB/
10GHz (4.968GHz) Synth
Phase Noise
100 Hz
Frequency Offset
1 MHz


Agilent 19:38:12 Jun 30, 2008
R T
Ref 4 dBm
#Atten 14 dB
Samp
Log
10
dB/
LgAv
100
W1 S2
S3 FC
AA
£(f):
f>50k
Swp
24G synth (6.120GHz) 1MHz Span
Center 6.120 000 0 GHz
Span 1 MHz
Res BW 9.1 kHz
VBW 9.1 kHz
Sweep 46.08 ms (601 pts)


Agilent 19:24:52 Jun 30, 2008
R T
Ref 4 dBm
#Atten 14 dB
Samp
Log
10
dB/
LgAv
100
W1 S2
S3 FC
AA
£(f):
f<50k
FFT
24G 10kHz Span
Center 6.120 000 000 GHz
Span 10 kHz
Res BW 91 Hz
VBW 91 Hz
Sweep 125.4 ms (601 pts)


Agilent 19:23:19 Jun 30, 2008
R T
Mkr1 6.120 000 00 GHz
3.043 dBm
Ref 4 dBm
#Atten 14 dB
Samp
Log
10
dB/
Marker
6.120000000 GHz
3.043 dBm
24G 100kHz Span
LgAv
42
W1 S2
S3 FC
AA
£(f):
f<50k
Swp
Center 6.120 000 00 GHz
Span 100 kHz
Res BW 910 Hz
VBW 910 Hz
Sweep 460.4 ms (601 pts)





BEACON NEWS

GB3CAM 24GHz

Bernie G4HJW emails the following update ...

"I've added a single page web site for GB3CAM:
http://www.earf.co.uk/GB3CAM.htm
Thanks to all the people who have added a 'spot' report to www.Beaconspot.eu - it helps a great deal to know it is being heard!

The beacon is not installed yet but it has a replacement PA and on Saturday I rebuilt the reference unit. It is still the same GW4DGU Driscol Oscillator but I fixed a heater transistor to the milled box and a thermistor in a small hole in the side. I controlled it to 40 degrees C and wrapped the whole thing in 10mm polystyrene foam. It is now rebuilt in to a Philips FX5000 module, so that it will fit in the same rack as the 3cm beacon units. The oscillator now settles down in around 90 minutes and once settled, stays there. Also, the retrace is excellent. I powered it off and stuck it outside for 2 hours to cool down and after a further 90 minutes it was within a few tens of Hz (at 24GHz) to where it was. Well done 'DGU on the oscillator design!

I went over to G4DDK's QTH to commission the new PA. We gingerly upped the drive until it was producing around +24dBm out and just starting to go in to limiting. From what limited information I have on the PA (an Arcom 25PA003 from an Alcatel link), this is what we should expect.

The beacon produces a lovely stable note thanks to Chris's very expensive crystal and is now running in may garage on soak for the next 2 weeks. We have arranged to install the 24GHz beacon on September the 18th."

SCOTTISH MICROWAVE "FIRSTS" ...

Just before I went on holiday I saw an announcement from Mark GM4ISM on Moon-net that he had worked RW1AW on 3.4GHZ EME at the end of July. This is almost certainly a First.

The second came in a recent email from Jon GM4JTJ, for a 5.7GHz QSO with GM4LBV on August 13th. Jon was running 400mW to a 50cm dish, whilst John GM4LBV was running 6W, and signals were S9+ over a 2km path. Currently there is no claimed 5.7GHz GM to GM QSO but one may have taken place some time ago without being reported. If anyone knows of an earlier GM to GM contact on 6cm, please let me have details, via **g3xdy@btinternet.com**

73 from John G3XDY

New 2.3GHz Record Claims

I have just processed record claims for two contacts which break the current 2.3 GHz EME record. Details are:

2.3 GHz EME 17384.4 km G4CCH (IO93QL) to VK7MO (QE37PC) CW 26 July 2008

2.3 GHz EME 17490.3 km G3LTF (IO91GG) to VK7MO (QE37PC) CW 27 July 2008

Best 73, John VK3KM
WIA Technical Advisory Committee

Ofcom proposes Universal Licence Exemption above 10GHz

I would guess some micowave/satellite interests might have an interest in this one. Please read the Ofcom emailed paper below first carefully before getting too upset! Comments should be sent to me to me direct please (see page 2 for my contact details)

Murray, G6JYB, RSGB Microwave Manager

Ofcom published a consultation on making devices licence exempt in the frequency bands above 10GHz. Ofcom published a consultation on increasing the power levels below which devices will be exempt from licensing in the frequency bands above 10GHz.

http://www.ofcom.org.uk/consult/condocs/low100ghz/

RSGB Input to MoD

Note the latest entry on here for the RSGB input to MoD who are under a £200m/pa bill on their frequencies with whom we share...

http://www.rsgb.org/spectrumforum/pdfs/consultations/final_joint_UKDSM_response.pdf

Every UK microwaver should look at these consulations as our frequency allocations could be radically affected.

GIPPSTECH ~ AUSTRALIA

In July I was one of seven VK1s who attended the Gippstech conference in Churchill east of Melbourne. This is a conference run by the local radio club and the main energy source is Peter VK3KAI, a keen microwaver.

One of the presentations was an outline of a general purpose synthesised LO board under development by Andy VK2AES who is one of our locals. He plans to make this board available as a partially built kit. Different VCOs will be required depending on the required frequency output in the range of about 1 to 10 GHz. It can be locked to an external 10 MHz reference or can use an onboard reference to start with. Phase noise is quite low. Last news was that the boards had been ordered and Andy was looking into getting them partly populated, at least with the SMD components and supplying them to buyers in that form.

Andy also presented an update on his cavity backed dish feed, which he described last year with a 23cm version on display; this year it was a 13cm version. The modelling he displayed indicates very good illumination of a dish, provided it's within the intended F/D range.

He works for a company here in Canberra. They do a lot of work for Defence and they have a good lab and a bunch of amateur licences on the premises. I saw their antenna test chamber and it's quite impressive.

Alan Devlin VK3XPD had a bunch of components and cables for sale and of course I "invested" in some adaptors and SMA connectors. Having gone from PL259 (audio connectors) to BNCs 30 years ago and N types 10 years later, I now have to equip with a whole new range of adaptors and cables if I want to use this microwave black magic. It's all very interesting ...

Neil Sandford, VK2EI, was there too. He gave some presentations on his 3.3GHz projects and something for 24GHz and we had a good chat. He lived in VK1 for quite a few years while working at one of the tracking stations.

73 Andrew Davis VK1DA

FAQ on Amateur Radio in Australia: http://vkfaq.ampr.org/

By Robin Lucas, G8APZ

I migrate to the warmer climes of SW France for the summer months where I have no broadband, and the dial-up sometimes runs as slow as 6kb/s. The ageing PC I have in France isn't up to running DTP software or some of the photo editing software that is required. The upshot is that I am writing this whilst on holiday, but I will have to leave it to the Editor to format it and tidy it up!

By the time this reaches you, the summer will be almost over, but there are still plenty of events left in the contest calendar.

CONTEST and ACTIVITY REMINDER

September

16-Sep	1900 - 2130 1.3/2.3GHz Activity Contest (RSGB Contest)
21-Sep	0900 - 2000 5.7GHz Cumulative
21-Sep	0900 - 2000 10GHz Cumulative
21-Sep	0900 - 2000 24GHz Cumulative

October

4-Oct	1400 - 2200 1.3 & 2.3GHz Trophies (RSGB Contest)
4/5-Oct	1400 - 1400 432MHz & up (IARU/RSGB Contest)
5-Oct	0900 - 1700 3rd 47/76 GHz Cumulative (Aligned with IARU date)
21-Oct	1900 - 2130 1.3/2.3GHz Activity Contest VHFCC (RSGB Contest)
26-Oct	0900 - 2000 All-band Activity Day Non competitive - Last Sunday in month

ONE YEAR ON..

It is now one year since I took over this column, and it seems a long time ago! It made me realise just how hard Peter has worked when, for the past twenty three years, he has produced this publication single handed.

Producing this column depends a great deal on your input and particularly when the winter months set in, when activity may be less than during the summer. However, I have often found it necessary to do some "arm twisting" and to spend time researching in order to have enough material.

We have a healthy level of activity here in the UK, so please do remember to report on what you have been doing. Reading about what we do on the microwave bands is very often an encouragement to others who may decide to join in!

So remember….. it takes you a few minutes to read this column but it takes a lot of my time to write it. Please keep your reports coming in!

BEACON NEWS

The first of the two Cambridge microwave beacons **GB3CAM** went on-air on 10th July 2008. This was the **10GHz** beacon (**10368.755 MHz**) situated at Wyton (IO92WI).

Although Wyton is only some 35m asl, the beacon antennas are 30m above ground level - well above the local tree cover. There is some obstruction due to other antennas on the same site however.

The beacon has been heard widely across the UK in its first few months of operation. The beacon keeper is Bernie, **G4HJW** who will be pleased to receive reports by email (***gb3cam@earf.co.uk)*** or via a spot on ***www.beaconspot.eu***

The **24GHz** beacon is due to be installed soon, according to the group's website and will most likely be active by the time you receive this Scatterpoint.

CONTESTS - VHF NFD 2008

From: Ray, GM4CXM,IO75TW

"I came on to give points away during VHF NFD 2008. Times have changed from the days when reports of 200+ UK stations were active on **23cm** during early 1980 events. It would be nice if the RSGB would give some exceptional bonus value points for **23cm** entrants because it has lost a lot since the inclusion of 6m.

I did not make the best start when I noted that **GM0ONN/p** near Aberdeen had worked **PI4GN** and my test with **PI4GN** only produced a short duration of reception both ways. The west coast looked like missing out again!

G3CKR/P was worked off the back of their dish but it would have been good to have heard their full capability. **G3RCM/p** was very strong despite running QRP. **G0VHF/p** and **G0FBB/p** were excellent signals out of JO01.

The contact with Ian **GM0ONN/p** was a new initial and made interesting by the fact we couldn't hear each other on a direct path. After admitting failure I started to rotate the antenna to work Ed **GM3SBC** on a more easterly bearing. Ian's signal suddenly appeared quite weakly, peaking to the south east in the direction of high hills in the Borders to the south of Peebles that I used in the past to hear **LA** beacons during a lift.

With 10 minutes to go I felt it was worth having a go with **PA6NL** again and surprisingly we made it with 3 minutes to go and my ODX for the weekend.

The weather was windy and either very overcast or raining. Thanks to all the portables who ventured out and appeared on **23cm**."

Ray made the following contacts in excess of 400km: **PA6NL** JO21 708km, **G0FBB/p** JO01 638km, **G0VHF/p** JO01 587km, **G3TCR/p** IO91 558km, **G2BQY/p** IO81, 518km, **G4BRK** IO91 517km, **G3TA** IO81 488km, **G4KIY** IO92 466km, **G3SDC/p** IO92 431km,

During the VHFNFD weekend, Frank Laanen, **PE1EWR** reported that on **23cm** he worked 14 stations, with his best DX **DF5GZ/p** (JN47AX) at 506km. On **13cm** he had only three contacts, the best of which was **G4DDK** at 167km.

Frank comments, "On **23cm** and **13cm**, one could call "CQ Contest" for half an hour without an answer. Activity on the microwave bands appears to be going down. Tuning around the band gives no improvement. As no station is heard, the band could be dead! If you hear a faint signal, it turns out to be one you already had a contact with... A single operator station can't manage properly under these conditions and has to decide on the most productive band."

G0VHF/p (JO01pu) found the QSO count this year to be down on last year. Their best DX on **23cm** was **DM7A** in JO60LK at 828km. Three reports on the state of activity, and one thing in common – they all comment on the level of participation.

RSGB UK ACTIVITY CONTEST

The July event took place on Tuesday 15th July (between 19.00z and 21.30z). Ray, **GM4CXM** reports having a very good session, with above average conditions from the West of Scotland towards the south east. John **G4EAT** (JO01hr) was a very good tropo signal and Phil **G3NEO** (10w) was worked on SSB rather than the usual CW. David **M0GHZ**, Bryan **G8DKK** and Simon **G8ATB** were also very strong.

Most of Ray's contacts were the result of CQ calls. He notes that Scottish activity was down on previous events with Alan **GM0USI** "just down the road" being the only other **GM** active. Nothing was heard from from **GI** this time.

Ray's contact with Chris **GW4DGU** (IO72) was "different" on this occasion insofar as it was purely via aircraft scatter whereas an hour or so later he was a solid tropo signal whilst testing with **GM0USI**.

A test with Sam **G4DDK** (JO02) produced only two very weak aircraft reflections but no contact resulted. Nothing was worked outside the UK despite attempts with **OZ1FF** and **PA0S**.

Ray's best QSOs over 400km were:
G4EAT,JO01 572km, **G3XDY**,JO02 565km
G4RGK,IO91 541km, **M0GHZ**,IO81 521km,
G8DKK,IO91 518km, **G8OHM**,IO92 425km,
G4KIY,IO92 466km and **GW4DGU**,IO71 450km

10GHz CUMULATIVE

Steve **G1MPW** and Dave **G6KIE** worked from their usual site near Firle Beacon JO00 - and in stark contrast to last month the weather was much better - warm and sunny all day with just a gentle breeze .

After a bit of a slow start things picked up nicely - and using KST as well as 144 MHz resulted in a total of 15 QSOs. The best DX was **F1GHB/P** (IN88) at 349km. The highlight of the day was **PA3AWJ** in JO21 at 334km when Steve and Dave made their first QSO with **PA**.

There were some odd conditions during the day however - **GB3SCX** (due west of them) started off at it's usual fairly low level - but was peaking S9 by the end of the day - and at the same time any signals from the east were up to 10 degrees off the calculated bearing.

Steve **G1MPW** wondered whether this could be another case of North Sea Reflection? It really requires another station to observe the same effect to identify the reflection point. (More on this later in the column)

From: Richard Newstead, G3CWI

It was hot and sunny on Axe Edge for once. Dave **G0DJA** joined me to see how **10GHz** had changed since the wideband days (his last contact being in 1987).

Contacts flowed at a pleasant rate - never fast but never too slow either. An operating time of just over two hours saw 13 contacts in the log (2 new squares). ODX was **G1MPW/p** at 297km - keep going with that CW practice! The 300km barrier remains annoyingly hard to break it seems.

Average distance was a respectable 159km with conditions seemingly up a bit. Initials were **G8KQW**, **G1MPW/p** and **G3UYM/p**.

The main improvement was an increase in talkback power on 2m from 2.5 Watts to 30 Watts which made life very much easier for all concerned.

Dave seemed impressed with narrowband and the level of activity. Hopefully he will be QRV himself before too long.

10GHz – NEWS FROM EI

From: Tony Gallagher, EI4GHB
<tony_g_ireland@yahoo.com>

Our long awaited transverters for **10GHz** still haven't arrived so it'll be a month at least before I'm active on **10GHz**. However, I have just bought a Kuhne **23cm** transverter, (2.5 Watts) with a 16db gain to work with my FT817. All my GHz work will be from hill tops on the south coast of Ireland so I hope to be able to work the UK and parts of Europe, fingers crossed! If anyone would like to contact me to organise a sked, they can do so by email. Some pictures of my **23cm** kit can be seen on my website in the "EI4GHB Galleries" section at this URL： www.freewebs.com/ei4ghb

NORTH SEA REFLECTIONS

An email from Peter Blair, **G3LTF** records some interesting cases of this phenomena. Following the articles in last month's Scatterpoint, Peter found a note which he had written some time ago, entitled "Seriously Anomalous Propagation!".....

"This note describes measurements on an indirect path propagation event, it is of interest because although this particular effect, in this geographic area has been observed before this is believed to be the first time that measurements have been made and multi band observations recorded.

On August 5th 2003 there was exceptional tropo in the North Sea area with strong ducting out to 600km. I was making my usual beacon check round at 0900 and heard **GB3ANG** (IO85) on 432 MHz on a heading of about 80 degrees but when I turned the beam to the North (the direct heading is 355 degrees) the signal was much weaker.

Now Simon **G3LQR** (JO02QF) has in the past worked the Faeroes on 432 MHz by beaming East and (we assumed) getting a reflection from the Dutch coast, but this was the first time that I had observed the effect, and I am a long way from the UK coast line (IO91GG).

I next looked for the **GB3MHX** (Martlesham) beacon on **10368MHz** and to my surprise found that I could hear at S8 it on a heading of 78 degrees but it was barely detectable on the direct heading of 62 degrees. I got Simon **G3LQR** on the band (0919) and we made contact on the direct path at 55/57, I then turned the 60cm dish to 78 degrees and Simon scanned the sector, finding me on a heading of 96 degrees. We exchanged 589/569 and also ssb; the signal was fading but quite coherent.

Finally, I looked for the **GB3MHS** beacon on **2320 MHz** and found it on the same heading, 78 degrees, again with very little signal on the direct path.

I have roughly plotted the various paths on a map of the area and it is clear that the reflection is in the area of the Dutch coastline around The Hague.

Is this a reflection from the structure of the coastline, buildings etc, a classical radar reflection in fact or could it be from a discontinuity in the duct as it passes from sea to land? Whatever the cause, it is rather interesting when you realise that the reflection point is about 380km from my location."

A very interesting contribution from Peter, and no doubt there are more occasions when this type of effect will be observed. Whilst keeping an open mind, I have dismissed reflections from natural or man made features as explaining this phenomena. If this was the cause, we would see the effect all the time, and quite simply we do not. In all the cases I am aware of there has been anomalous propagation of the ducting type present, and it is only in this situation that these unusual reflections seem to occur.

We clearly need to observe and record as much detail as we can in future events of this type.

MORE 10GHz TESTS

Clive, **G4FVP** went out portable on 3rd August to do some **10GHz** tests to evaluate potential portable locations near Shildon, Co Durham (IO94DO) and to evaluate a new 46cm dish used with a **DB6NT** transverter plus **DL2AM** 2 Watt amplifier.

The first site had a panoramic view to the North East in the direction of Durham and Sunderland. Eddie **G0EHV/p** to the north in Gateshead IO94EW (37km) was 59++ and worked using both FM and SSB. Rob **M0DTS** on Teesside, IO94IL (30km) was not heard on a direct path but he was worked by scatter at RS55 when beaming at two wind turbines visible some 10km away. Richard **G3CWI/p,** at Pym Chair in IO83xg, (150km) was heard weakly on a direct path calling on CW. Richard also copied **G4FVP/p** on CW but the signal was too weak for a QSO.

At the second site, a beacon search showed **GB3MLE** at 519 and **GB3XGH** (114km) at 52S. **G0EHV/p** to the north was worked on an indirect heading with QSB varying his signal between 51 – 53; there was no obvious reflecting point. **M0DTS** was

somewhat stronger at 55 and this time heard on a direct path (16km).

G4PBP in Wolverhampton IO82WO (224km) called and was worked at 519<>53S from here, although an attempt to work **G4BAO** JO02CG (288km) was unsuccessful.

Clive, **G4FVP/p** was out again on 7th August in IO94DO for a pre-arranged sked with **G3CWI/p** who was operating from Shillhope Law on the Scottish Borders in IO85VJ. A **10GHz** contact was made with **G3CWI/p**, at 94km. **M0DTS,** IO94IL at 30km was worked in several directions by scatter especially when beaming North East towards a heavy rain storm.

Clive then moved to IO94DO 195m asl, where he worked **G4PBP** (IO82WO at 224 km CW and SSB at reasonable strength but with deep QSB. **M0DTS** (IO94IL) at 30km was worked again at good strength and finally a QSO with John **G4EAT** (JO01HR) at 355km for an ODX QSO.

From: Richard Newstead, G3CWI/p

On 3rd August, at lunchtime, I went up Merryton Low (IO93ad). I had a good contact with John **G4EAT** (248km) on ssb (we normally only manage CW). That was followed by a **10GHz** net with **G4PBP** and **G3VKV**. Due to fortuitous alignment and very strong signals we could all hear each other at the same time. It was quite windy which made keeping the dish on bearing tricky. A test with Ralph **G4ALY** in Cornwall failed to give any results. **GB3KBQ** (Taunton) was audible throughout. A little later Ralph rang me to advise that the North East microwavers were going out portable later in the afternoon. I therefore packed up and went home with a view to going out portable to a different site that better favours the north east.

From Pym Chair IO83xg (1W 40cm dish) I easily made an ssb contact with Rob **M0DTS** (143km). A test with Graham **G4FVP/p** failed but Eddie **G0EHV/p** called me on ssb and we made a cross-mode contact (184km). Stations further south were able to make some rainscatter contacts into mainland Europe but the rain was unlikely to have been above the horizon up here.

Richard also went out on 7th August and had a successful trip up to Northumberland to activate Shillhope Law on **10GHz**. This location is 501m asl, in IO85vj. He worked Russ **G4PBP** on CW at 310km (first QSO over 300km for Richard). and then had QSOs with **G4FVP/p** on CW and **M0DTS**.

EME – NEW RECORDS

VK3KM informs us that he has recently processed record claims for two contacts which break the current **2.3GHz** EME record.

The first claim was for a CW QSO on 26th July 2008 at a distance of 17384.4km between **G4CCH** (IO93QL) and **VK7MO** (QE37PC). The next day, a CW QSO between **G3LTF** (IO91GG) and **VK7MO** took the record to 17490.3km.

Congratulations are due to all three stations for these achievements.

RAINSCATTER

Numerous rainscatter contacts were noted during July and August, with most being reasonably local within the UK.

On 27th July, some more distant RS was available. On **10GHz** G4PBP(IO82) worked **F6DKW** and **F9ZG/P both in** IN98. **G4EAT** (JO01) worked **DF6NA** and **DL3IAS** both in JN49 plus **F9ZG/p**. **OK1JKT/P** (JO60) was also QRV and worked **F6DKW** and **ON5TA**.

On 31st August, John, **G3XDY** (JO02) worked some new squares and some good distances over a four hour period. John tried several tests on **9cm**, but signals were weak, and no QSOs resulted. However, on **6cm**, his log includes CW QSOs with **F5HRY** (JN18) 384km, **F1BZG** (JN07) 470km, **DL7QY** (JN59) 707km, and **DL3IAS** (JN49) 585km. Both JN49 and JN59 were new squares on **6cm** for John.

It was even better on **3cm** where John bagged **DL7QY** (JN59) 707km (new square), **DF6NA** (JN49) 663km, **F6APE** (IN97) 540Km, **F1BZG** (JN07) 470km, **DJ5BV** (JO30) 438km, and half a dozen French stations in JN18/JN19.

24GHz FIRST LX - HB9

On 29th July, Willi **LX1DB** worked Arnold, **HB9AMH/p** on **24GHz** via rainscatter. Reports of 55S were exchanged both ways, and this is believed to be a first LX-HB9 on **24GHz**.

AND FINALLY...

Here in France, I regularly look on the 2m microwave talkback frequency (144.175MHz), since it is in one of the rig's memories, along with beacons and I often come across FM signals on that frequency.

It reminded me of the 1982/1983 DXpeditions to C31 which I was part of. Our operating QRG was 144.180, and we frequently had problems from FM on 175. Twenty five years later, and these dinosaurs are still in the SSB part of the band.

I made a point of calling CQ in the recent 2M contest with QRO close to 175, and the QRM soon vanished, but no doubt it will persist for many more years.

73, Robin, G8APZ

Please send your activity news for this column to:
scatterpoint@microwavers.org

G3LTP ~ Silent Key

The following email was recently received from Martin Harrison, G3USF, Chairman of the RSGB Propagation Studies Committee …

I regret having to be the bearer of sad news again, namely of the death of Ray Flavell, G3LTP on 24 August at the age of 83.

More recent members will not have known him but Ray was a former chairman of PSC back in (as I recall) the 1970s. Professionally he was a meteorologist and he brought his very considerable professional skills to bear within our hobby, notably by means of articles on VHF propagation - though his interests and enthusiasms in propagation went wider than that. Although it is a good many years since he was active in PSC, he kept in touch until very recently, despite the failing health that he suffered in recent years.

On behalf of PSC, I will be sending a note to his son.

Martin Harrison G3USF, Chairman PSC

Editor's note:

Sad news indeed. Many OTs in the Microwave Group will remember Ray from our early days in VHF/UHF and his important contributions to the study of weather and climatic factors in determining propagation.

Our sincere condolences go his family.

FOR HP TEST GEAR GEEKS

I have come across this very interesting website:

http://www.hpmemory.org/

It deals with the history of HP test equipment from 1940 to 2000. the 1980-2000 period is not available yet but should come soon.

I think this is a very valuable information when you go to the second hand market for HP equipment.

73
Edouard, F4EXB.

WEBSITE UPDATES

It's good to see folk updating their websites these days. Your humble editor used to do his every month but these days it's an event if the "World above 1000MHz" pages are updated every six months! The following pages have been recently updated with all kinds of interesting microwave stuff… take a look!

http://homepage.ntlworld.com/john.g4bao/index.htm
John's website has recently been updated with some excellent info on how to make a 3.4Hz transverter from suplus Ionica units.
(I'm now kicking myself that I "heat gunned" all the components off my domestic Ionica system for spares!! ... editor)

http://g4hup.com
a.. Issue 2 DFS PCBs - availability and features
b.. DFS30 - a new application which allows GPS locking of Icom IC706 series transceivers
73 Dave, G4HUP

http://www.batc.tv
Videos of the presentations given at this year's AMSAT-UK International Space Colloquium and the Sheffield Microwave RT in July are now available on the British Amateur Television Club (BATC) video site.

To access the videos go to http://www.batc.tv/ and click on the 'Archive' icon on the left.

Select which AMSAT-UK lecture you wish to watch then click the 'Play' (>) icon.

Click on the icon between the 'Progress' bar and the 'Volume' bar to get full screen viewing.

The full AMSAT lecture programme can be seen at:
http://www.uk.amsat.org/content/view/640/213/

The PowerPoint presentation slides can be viewed at:
http://www.uk.amsat.org/content/view/664/235/

Pictures from the event can be seen at:
http://www.uk.amsat.org/gallery2

AMSAT-UK publish a newsletter, OSCAR News, which is full of Amateur Satellite information. Join online at https://secure.amsat.org.uk/subscription/

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